

# High Speed Rail Safety – Innovative Approach

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# **EMSD - Our Roles**

# EMSD - Our Roles

- The Electrical & Mechanical Services Department (EMSD), Hong Kong Railway Safety Regulator
- Cap. 556 - Mass Transit Railway (MTR) Ordinance and Cap. 556A - MTR Regulations
- 10 Metro Lines + 2 Cross Boundary Railway Lines
- Technical endorsement of new railway lines, promotion of railway safety, and regulating the safety performance of railway operators



# Cross Boundary Railway

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(1910)



Lo Wu Station



First steam Locomotive in Hong Kong



# Cross Boundary Railway

## Through Trains (140kph)



# Cross Boundary Railway

## High Speed Rail (300kph)

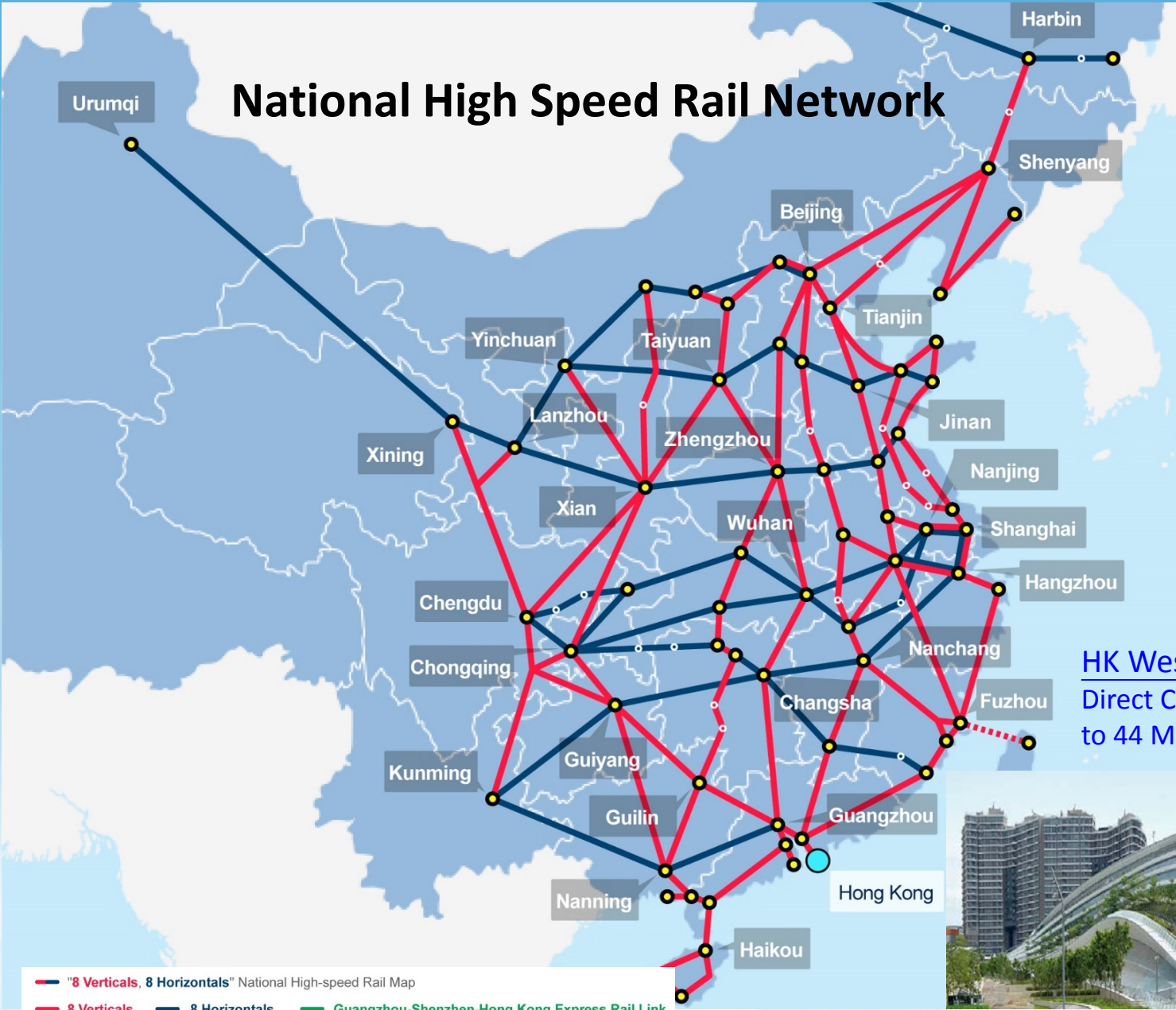
- Length 142km (HK Section - 26km tunnel)
- 300kph (HK Section - 200kph)
- 47 min to Guangzhou
- Less than 9 hours to Beijing / Shanghai





# Cross Boundary Railway

## National High Speed Rail Network



- 25,000km (2017) National High Speed Rail Network
- Target to reach 30,000km by 2020 covering 80% major cities

HK West Kowloon Station  
Direct Cross-boundary freight to 44 Mainland destinations



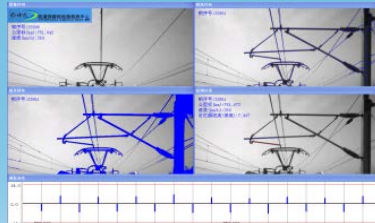
# **Innovative Approach**

# Innovative Approach

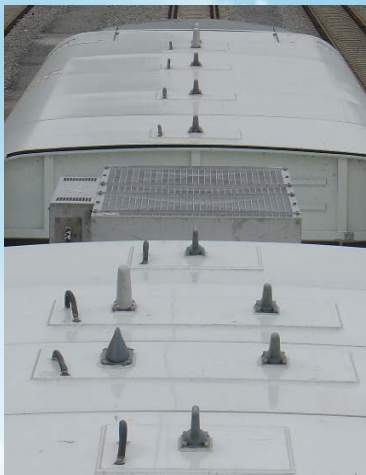
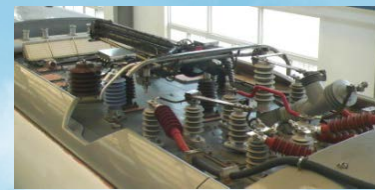
**Comprehensive Inspection Train (CIT)** - running every inch of high speed rail track every 15 days



Track Geometry Inspection



Overhead Line Inspection



Communication Inspection



Signal Inspection

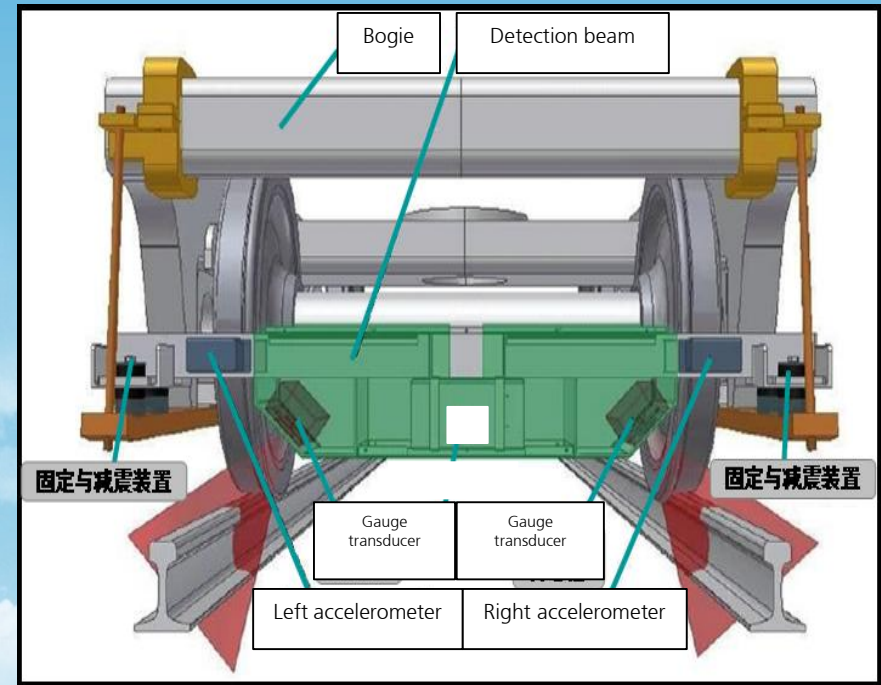


**Comprehensive Inspection Train (CIT)**

# Track Geometry Inspection System

- Track Geometry Parameters

- ✓ Track Gauge
- ✓ Rate of change of track gauge
- ✓ Horizontal Alignment
- ✓ Vertical Alignment
- ✓ Cant
- ✓ Track Twist

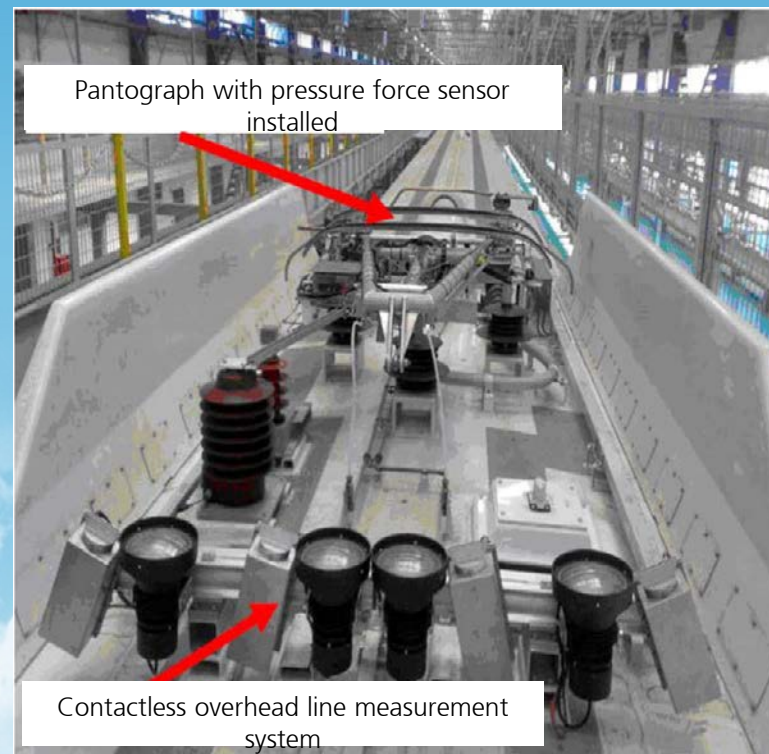


- TB/T 3355-2014 《轨道几何动态检测及评定》

# Overhead Line Inspection System

- Overhead Line Parameters

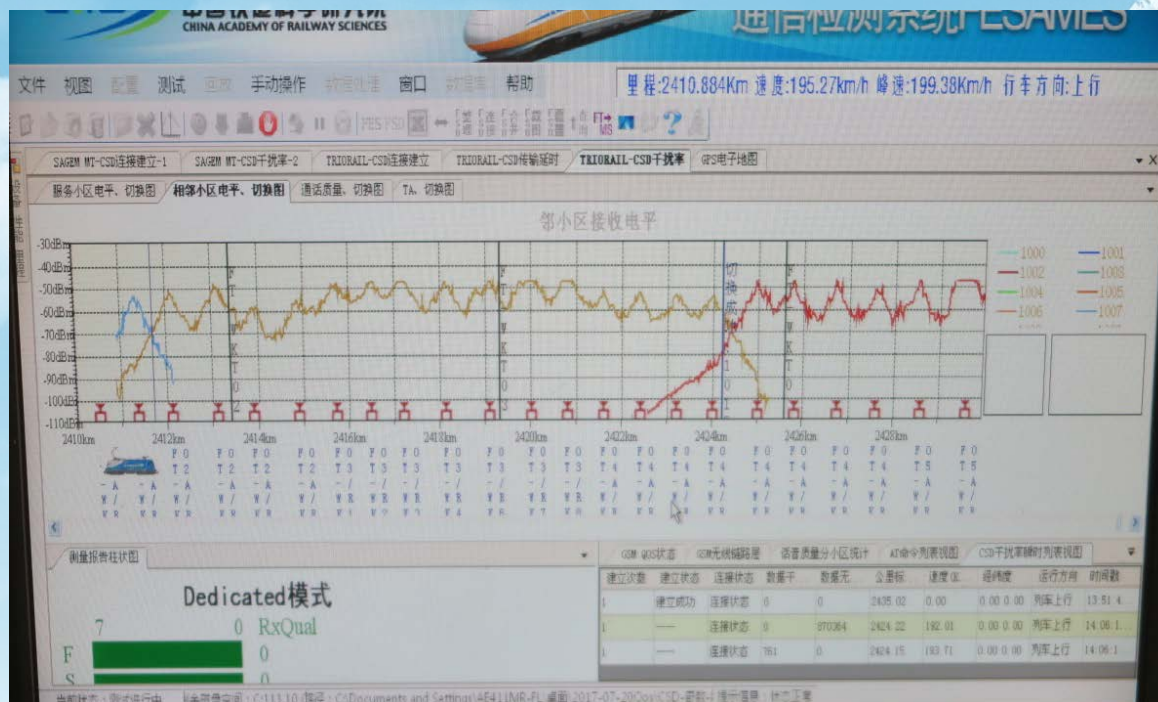
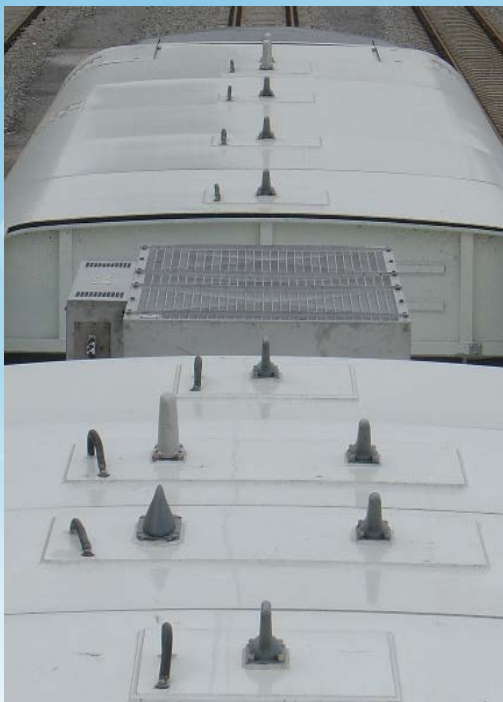
- ✓ Height
- ✓ Stagger
- ✓ Hard point (Vertical acceleration)
- ✓ Rate of change of height
- ✓ Contact force with pantograph
- ✓ Arcing
- ✓ Voltage



- TB 10758-2010 《高速铁路电力牵引供电工程施工质量验收标准》
- TB 10761-2013 《高速铁路工程动态验收技术规范》
- TG/GD124-2015 《高速铁路接触网运行维修规则》

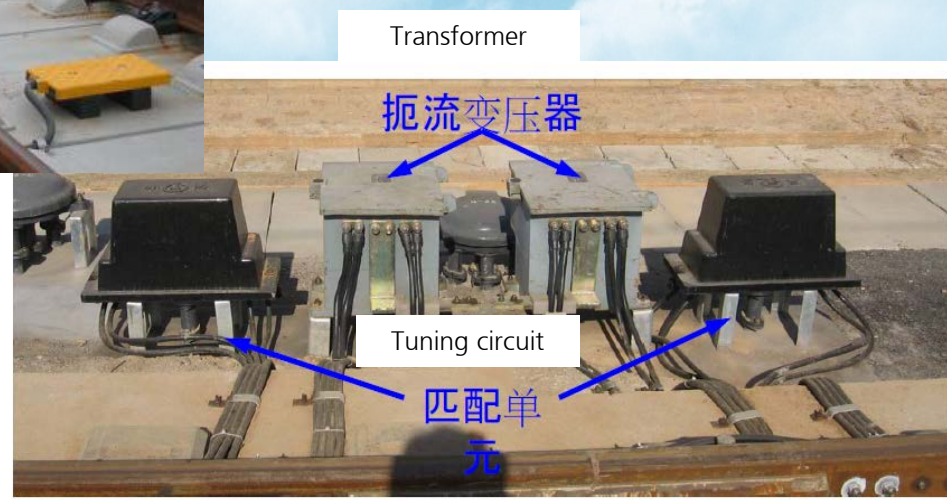
# Communication Inspection System

- GSM-R Communication System Parameters
  - ✓ Field strength measurement
  - ✓ Quality of voice call and data transmission
- TB 10761-2013 《高速铁路工程动态验收技术规范》



# Signal Inspection System

- Trackside Equipment Parameter
  - ✓ Track circuit
  - ✓ Compensation Capacitor
  - ✓ Balise
- TB 10761-2013 《高速铁路工程动态验收技术规范》



# Wheel Monitoring System

- Installed in Shek Kong Stabling Sidings
- Inspect train wheels every 2 day

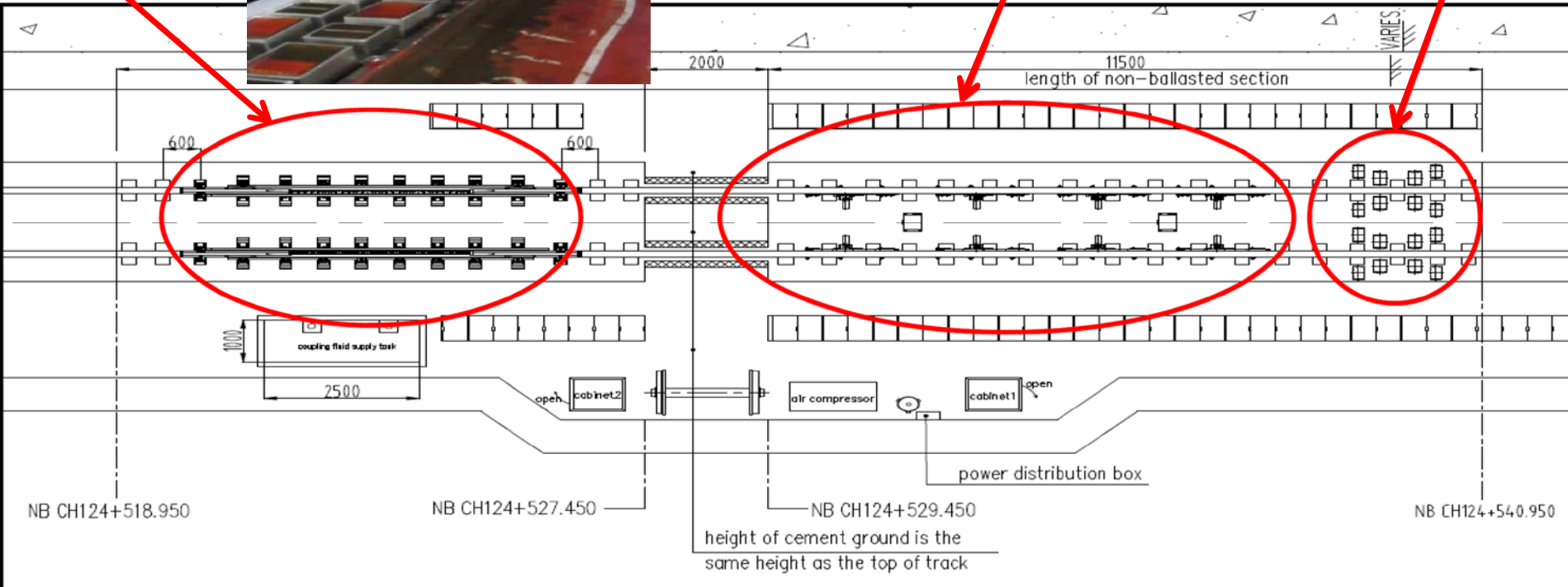


Crack Detection System



Wheel Roundness Inspection System

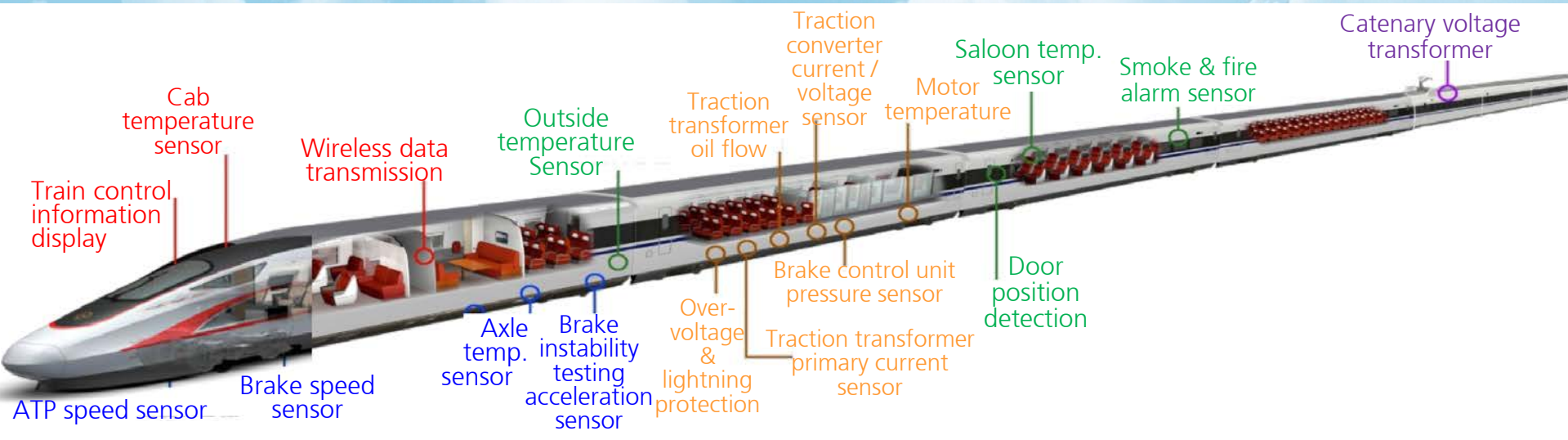
Wheel Profile Inspection System





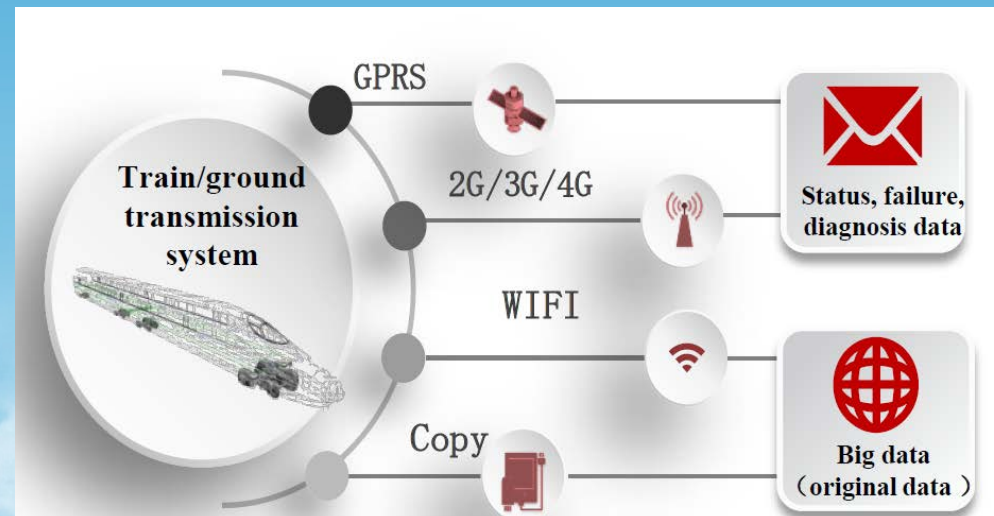
# On-board Monitoring

- Major systems include traction, braking, door, bogie critical components, and other main subsystems
- 2700 parameters including operating speed, acceleration, compressed air pressure, voltage, current, temperature
- Status data collection, online diagnosis, early warning, failure solving instruction and automatic speed control

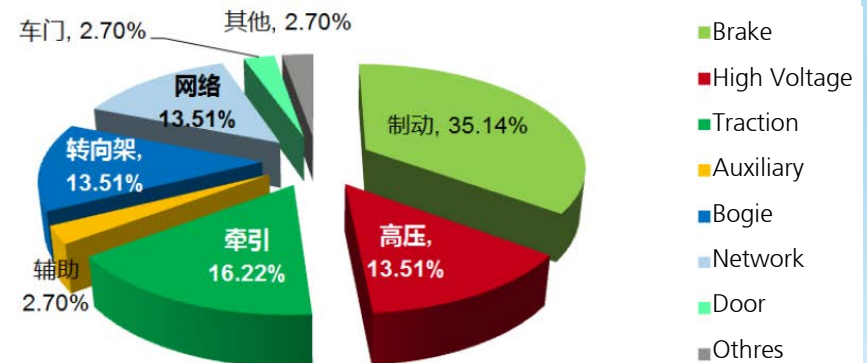


# Operator/Manufacturer Monitoring

- Measured data transmitted from train to ground through GPRS or 3G/4G.
- Remote monitoring by Operator/Manufacturer
- Support predictive maintenance
- Big data analysis for maintenance planning and future design refinement



影响运营秩序--故障手册梳理



The background of the slide is a clear blue sky filled with soft, white, fluffy clouds. The clouds are scattered across the frame, with some larger ones on the right side and smaller ones on the left. The overall tone is bright and airy.

# **Regulatory Regime for High Speed Rail Safety**

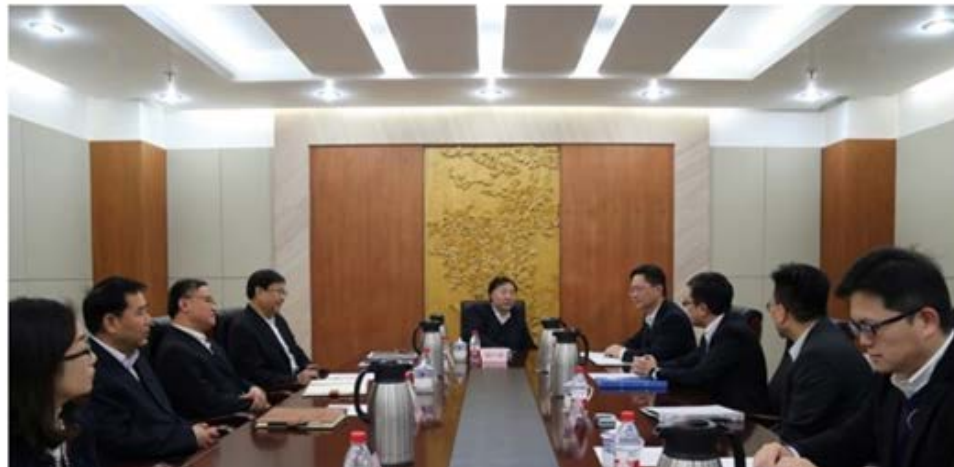
# Regulatory Regime

- Collaboration with Mainland Railway Safety Administration
- High Speed Train Driver Licensing
- EMSD Staff Competence

## 杨宇栋会见香港特别行政区政府机电工程署署长薛永恒

发布时间：2018-11-13 09:03 来源：国家铁路局 字号：T T

11月12日，交通运输部副部长、国家铁路局局长杨宇栋在北京会见了来京参加车辆驾驶人员资格管理及安全监管工作首次季度会议的香港特别行政区政府机电工程署署长薛永恒，双方就深化内地与香港铁路领域务实合作交流，特别是广深港高速铁路香港段开通后相关监管工作深入交换了意见。



# High Speed Train Driver Training



Driving Practice in Simulator

- Classroom & practical training including simulator driving
- Mainland Authority High Speed Train Driving License
- Hong Kong/Mainland Railway Operators pre-operation training

# Uplift EMSD Staff Competence

- Attend high speed train driver training course including classroom/simulator training
- Attach at Guangzhou Operation Control Centre to acquire practical knowledge in High Speed Train Dispatch





MTR High Speed Train Driver on board of CRH380A ready to depart from West Kowloon Station



**Thank You**